

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-75 (cancelled)

76 (Withdrawn). A method for modulating the immune response of a subject, the method comprising administering to said subject a vaccine according to claim 108.

77 (Withdrawn). The method of Claim 76, wherein said sphingoid-polyalkylamine conjugate comprises a sphingoid backbone carrying, via a carbamoyl bond, at least one polyalkylamine.

78 (Withdrawn). The method of Claim 76, wherein said modulation includes stimulation or enhancement of the immune response.

79 (Withdrawn). The method of claim 76, wherein said biologically active molecule is associated with said sphingoid-polyalkylamine conjugate.

80 (Withdrawn). The method of Claim 76, wherein said biologically active molecule has, at a physiological pH, a net negative dipole moment, a net negative charge or contains at least one region having a net negative charge.

81 (Withdrawn). The method of Claim 76, wherein said biologically active molecule is an immunomodulator selected from the group consisting of a nucleic acid molecule, an amino acid molecule and a low molecular weight compound.

82 (Withdrawn). The method Claim 76, wherein said biologically active molecule is an antigenic protein, antigenic peptide, antigenic polypeptide, or a carbohydrate.

83 (Withdrawn). The method Claim 76, wherein said nucleic acid molecule is an oligodeoxynucleotide (ODN).

84 (Withdrawn). The method of Claim 76, further comprising administering to said subject an immunostimulating agent.

85 (Withdrawn). The method of Claim 84, wherein said immunostimulating agent is administered concomitant with, or within a time interval before or after administration of said sphingoid-polyalkylamine conjugate.

86 (Withdrawn). The method of Claim 76, wherein said sphingoid-polyalkylamine conjugate forms a lipid assembly.

87 (Withdrawn). The method of Claim 86, wherein said lipid assembly comprises vesicles or micelles or a combination of same.

88 (Withdrawn). The method of Claim 87, wherein said biologically active molecule is associated with said lipid assembly.

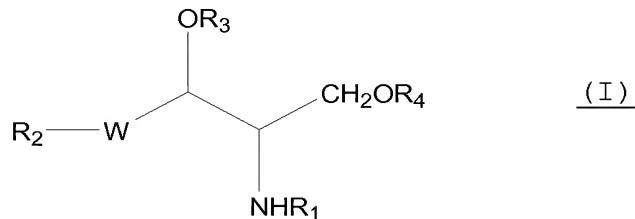
89 (Withdrawn). The method of Claim 76, wherein the sphingoid is selected from the group consisting of ceramide, dihydroceramide, phytoceramide, dihydriophytoceramide, ceramine, dihydroceramine, phytoceramine, and dihydriophytoceramine.

90 (Withdrawn). The method of Claim 89, wherein said sphingoid is ceramide.

91 (Withdrawn). The method of Claim 90, wherein said polyalkylamine is spermine, spermidine, a polyamine analog or a combination thereof.

92 (Withdrawn). The method of Claim 76, wherein said sphingoid-polyalkylamine conjugate is N-palmitoyl D-erythro sphingosyl carbamoyl-spermine (CCS).

93 (Withdrawn/Currently Amended). The method of Claim 76, wherein said sphingoid-polyalkylamine conjugate has the following formula (I):



wherein

R₁ represents a hydrogen, a branched or linear alkyl, aryl, alkylamine, or a group -C(O)R₅;

R₂ and **R₅** represent, independently, a branched or linear C₁₀-C₂₄ alkyl, alkenyl or polyenyl group;

R₃ is hydrogen or and R₄ are, independently, a group -C(O)-NR₆R₇, in which R₆ and R₇, being the same or different for R₃ and R₄, represent, independently, a hydrogen, or a saturated or unsaturated branched or linear polyalkylamine, wherein one or more amine units in said polyalkylamine may be a quaternary ammonium, and R₄ is, independently, a group -C(O)-NR₆R₇, wherein at least one of R₃ and /or R₄ comprises said polyalkylamine; or R₃ is a hydrogen; or R₃ and R₄ form, together with the oxygen atoms to which they are bound, a heterocyclic ring comprising -C(O)-NR₉-[R₈-NR₉]_m-C(O)-, in which R₈ represents a saturated or unsaturated C₁-C₄ alkyl and R₉ represents a hydrogen or a polyalkylamine of the formula -[R₈-NR₉]_n-, wherein said R₉ or each alkylamine unit -R₈NR₉ may be the same or different in said polyalkylamine; and n and m represent, independently, an integer from 1 to 10; and

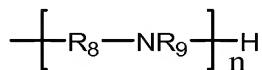
W represents a-CH=CH-, -CH₂-CH(OH)- or -CH₂-CH₂- group.

94 (Withdrawn). The method of Claim 93, wherein R₁ represents a -C(O)R₅ group, R₅ being as defined.

95 (Withdrawn). The method of Claim 93, wherein said R₂ and R₅ represent, independently, a linear or branched C₁₂-C₁₈ alkyl or alkenyl group.

96 (Withdrawn). The method of Claim 93, wherein W represents -CH=CH-.

97 (Withdrawn). The method of Claim 93, wherein R_1 represents a $-C(O)R_5$ group; R_5 represents a $C_{12}-C_{18}$ linear or branched alkyl or alkenyl; W represents $-CH=CH-$; R_2 represents a $C_{12}-C_{18}$ linear or branched alkyl or alkenyl; R_3 and R_4 represent, independently, a group $-C(O)-NR_6R_7$, and R_3 may also represent a hydrogen, wherein R_6 and R_7 represent, independently, a hydrogen or a polyalkylamine having the general formula (II):



wherein

R_8 represent a C_1-C_4 alkyl;

R_9 represents a hydrogen or a polyalkylamine branch of formula (II), said R_8 and R_9 may be the same or different for each alkylamine unit, $-R_8NR_9-$, in the polyalkylamine of formula (II); and

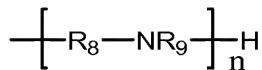
n represents an integer from 3 to 6.

98 (Withdrawn). The method of Claim 93, wherein R_3 is a hydrogen atom.

99 (Withdrawn). The method of Claim 93, wherein both R_3 and R_4 represent the same or a different polyalkylamine.

100 (Withdrawn). The method of Claim 93, wherein R_1 represents a $-C(O)R_5$ group; R_5 represents a $C_{12}-C_{18}$ linear or branched alkyl or alkenyl; W represents $-CH=CH-$; R_2 represents a $C_{12}-C_{18}$ linear or branched alkyl or alkenyl; R_3 and R_4 represent, independently, a group $-C(O)-NR_6R_7$, wherein R_6 and R_7 represent,

independently, an alkylamine or a polyalkylamine having the general formula (II):



wherein

R₈ represents a C₁-C₄ alkyl;

R₉ represents a hydrogen or a polyalkylamine branch of formula (II), said R₈ and R₉ may be the same or different for each alkylamine unit, -R₈NR₉-, in the polyalkylamine of formula (II); and

n represents an integer from 3 to 6.

101 (Withdrawn). The method of Claim 93, wherein R₁ represents a -C(O)R₅ group; R₅ represents a C₁₂-C₁₈ linear or branched alkyl or alkenyl; W represents -CH=CH-; R₂ represents a C₁₂-C₁₈ linear or branched alkyl or alkenyl; R₃ and R₄ form together with the oxygen atoms to which they are bonded a heterocyclic ring comprising -C(O)-[NH-R₈]_n-NH-C(O)-, wherein R₈ represents a C₁-C₄ alkyl, and wherein for each alkylamine unit having the formula -NH-R₈-, said R₈ may be the same or different; and **n** represents an integer from 3 to 6.

102 (Withdrawn). The method of Claim 93, wherein said R₈ is a C₃-C₄ alkyl.

103 (Withdrawn). The method of Claim 76, wherein said biologically active material is derived from influenza virus or an analog of a molecule derived from influenza virus.

104 (Withdrawn). The method of Claim 103, wherein said biologically active material is a combination of hemagglutinin and neuraminidase (HN).

105 (Withdrawn). The method of Claim 76, comprising intranasal or intramuscular administration of said conjugate.

106 (Withdrawn). The method of Claim 92, comprising intranasal or intramuscular administration of said N-palmitoyl D-erythro sphingosyl carbamoyl-spermine together with said biologically active molecule.

107 (Withdrawn). A method for stimulating or enhancing the immune response of a subject to influenza virus, the method comprising providing said subject with N-palmitoyl D-erythro sphingosyl carbamoyl-spermine (CCS) together with an influenza antigen.

108 (Previously Presented). A vaccine comprising an amount of sphingoid-polyalkylamine conjugate and an amount of an immune response modulating biologically active molecule, the amount of said biologically active molecule being effective to modulate the immune response of a subject and the amount of said sphingoid polyalkylamine conjugate being effective to enhance the activity of said biologically active molecule on the immune response of the subject, wherein said biologically active molecule is an antigenic protein, antigenic peptide, antigenic polypeptide, or a carbohydrate.

109 (Previously Presented). The vaccine of Claim 108, wherein said biologically active molecule is an immune response stimulating or enhancing biologically active molecule and is present in an amount effective to stimulate or enhance the immune response of the subject.

110 (Previously Presented). The vaccine of Claim 109, further comprising an immunostimulating agent.

111 (Previously Presented). The vaccine of claim 108, wherein said sphingoid-polyalkylamine conjugate comprises a sphingoid backbone carrying, via a carbamoyl bond, at least one polyalkylamine chain.

112 (Previously Presented). The vaccine of Claim 111, wherein said sphingoid backbone is selected from the group consisting of ceramide, dihydroceramide, phytoceramide, dihydriophytoceramide, ceramine, dihydroceramine, phytoceramine, and dihydriophytoceramine.

113 (Previously Presented). The vaccine of Claim 112, wherein said sphingoid is ceramide.

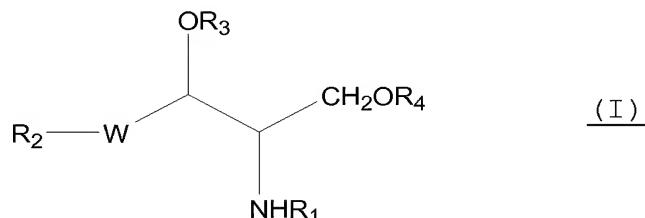
114 (Previously Presented). The vaccine of Claim 108, wherein said polyalkylamine chain is spermine, spermidine or a polyalkylamine analog of spermine or spermidine.

115 (Previously Presented). The vaccine of Claim 108, wherein said sphingoid-polyalkylamine conjugate is N-palmitoyl D-erythro sphingosyl carbamoyl-spermine (CCS).

116 (Previously Presented). The vaccine of Claim 115, wherein said biologically active molecule is a molecule derived from influenza virus or is an analog of a molecule derived from influenza virus.

117 (Canceled).

118 (Currently Amended). The vaccine of Claim 108, wherein said sphingoid-polyalkylamine conjugate has the following formula (I):



wherein

R₁ represents a hydrogen, a branched or linear alkyl, aryl, alkylamine, or a group $-C(O)R_5$;

R₂ and **R₅** represent, independently, a branched or linear $C_{10}-C_{24}$ alkyl, alkenyl or polyenyl group;

R₃ is hydrogen or and **R₄** are, independently, a group $-C(O)-NR_6R_7$, in which **R₆** and **R₇**, being the same or different for **R₃** and **R₄**, represent, independently, a hydrogen, or a saturated or unsaturated branched or linear polyalkylamine, wherein one or more amine units in said polyalkylamine may be a quaternary ammonium, and **R₄** is, independently, a group $-C(O)-NR_6R_7$, wherein at least one of **R₃** and /or **R₄** comprises said polyalkylamine; or

~~R₃~~ is a hydrogen; or R₃ and R₄ form, together with the oxygen atoms to which they are bound, a heterocyclic ring comprising -C(O)-NR₉-[R₈-NR₉]_m-C(O)-, in which R₈ represents a saturated or unsaturated C₁-C₄ alkyl and R₉ represents a hydrogen or a polyalkylamine of the formula -[R₈-NR₉]_n-, wherein said R₉ or each alkylamine unit -R₈NR₉ may be the same or different in said polyalkylamine; and n and m represent, independently, an integer from 1 to 10; and

W represents a-CH=CH-, -CH₂-CH(OH)- or -CH₂-CH₂- group.

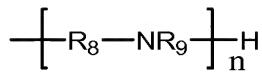
119 (Previously Presented). The vaccine of Claim 118, wherein R₁ represents a -C(O)R₅ group, R₅ being as defined.

120 (Previously Presented). The vaccine of Claim 118, wherein said R₂ and R₅ represent, independently, a linear or branched C₁₂-C₁₈ alkyl or alkenyl group.

121 (Previously Presented). The vaccine of Claim 118, wherein W represents -CH=CH-.

122 (Previously Presented). The vaccine of Claim 118, wherein R₁ represents a -C(O)R₅ group; R₅ represents a C₁₂-C₁₈ linear or branched alkyl or alkenyl; W represents -CH=CH-; R₂ represents a C₁₂-C₁₈ linear or branched alkyl or alkenyl; R₃ and R₄ represent, independently, a group -C(O)-NR₆R₇, and R₃ may also represent a hydrogen, wherein R₆ and R₇ represent,

independently, a hydrogen or a polyalkylamine having the general formula (II):



wherein

R₈ represent a C₁-C₄ alkyl;

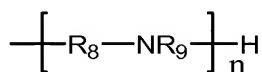
R₉ represents a hydrogen or a polyalkylamine branch of formula (II), said R₈ and R₉ may be the same or different for each alkylamine unit, -R₈NR₉-, in the polyalkylamine of formula (II); and

n represents an integer from 3 to 6.

123 (Previously Presented). The vaccine of Claim 118, wherein R₃ is a hydrogen atom.

124 (Previously Presented). The vaccine of Claim 118, wherein both R₃ and R₄ represent the same or a different polyalkylamine.

125 (Previously Presented). The vaccine of Claim 118, wherein R₁ represents a -C(O)R₅ group; R₅ represents a C₁₂-C₁₈ linear or branched alkyl or alkenyl; W represents -CH=CH-; R₂ represents a C₁₂-C₁₈ linear or branched alkyl or alkenyl; R₃ and R₄ represent, independently, a group -C(O)-NR₆R₇, wherein R₆ and R₇ represent, independently, an alkylamine or a polyalkylamine having the general formula (II):



wherein

R₈ represents a C₁-C₄ alkyl;

R₉ represents a hydrogen or a polyalkylamine branch of formula (II), said R₈ and R₉ may be the same or different for each alkylamine unit, -R₈NR₉-, in the polyalkylamine of formula (II); and

n represents an integer from 3 to 6.

126 (Previously Presented). The vaccine of Claim 118, wherein R₁ represents a -C(O)R₅ group; R₅ represents a C₁₂-C₁₈ linear or branched alkyl or alkenyl; W represents -CH=CH-; R₂ represents a C₁₂-C₁₈ linear or branched alkyl or alkenyl; R₃ and R₄ form together with the oxygen atoms to which they are bonded a heterocyclic ring comprising -C(O)-[NH-R₈]_n-NH-C(O)-, wherein R₈ represents a C₁-C₄ alkyl, and wherein for each alkylamine unit having the formula -NH-R₈-, said R₈ may be the same or different; and **n** represents an integer from 3 to 6.

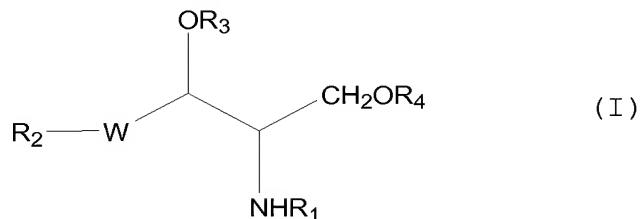
127 (Previously Presented). The vaccine of Claim 118, wherein said R₈ is a C₃-C₄ alkyl.

128-134 (Canceled).

135 (Previously Presented). A vaccine comprising an amount of sphingoid-polyalkylamine conjugate and an amount of an immune response modulating biologically active molecule, the amount of said biologically active molecule being effective to modulate the immune response of a subject and the amount of said

sphingoid polyalkylamine conjugate being effective to enhance the activity of said biologically active molecule on the immune response of the subject, wherein said biologically active molecule is an oligodeoxynucleotide (ODN).

136 (New). The vaccine of Claim 135, wherein said sphingoid-polyalkylamine conjugate has the following formula (I):



wherein

R_1 represents a hydrogen, a branched or linear alkyl, aryl, alkylamine, or a group $-C(O)R_5$;

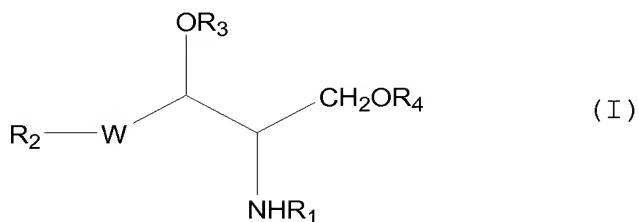
R_2 and R_5 represent, independently, a branched or linear $C_{10}-C_{24}$ alkyl, alkenyl or polyenyl group;

R_3 is hydrogen or a group $-C(O)-NR_6R_7$, in which R_6 and R_7 , being the same or different for R_3 and R_4 , represent, independently, a hydrogen, or a saturated or unsaturated branched or linear polyalkylamine, wherein one or more amine units in said polyalkylamine may be a quaternary ammonium, and R_4 is, independently, a group $-C(O)-NR_6R_7$, wherein at least one of R_3 and /or R_4 comprises said polyalkylamine; or R_3 and R_4 form, together with the oxygen atoms to which they are bound, a

heterocyclic ring comprising $-\text{C}(\text{O})-\text{NR}_9-\text{[R}_8-\text{NR}_9\text{]}_m-\text{C}(\text{O})-$, in which R_8 represents a saturated or unsaturated $\text{C}_1\text{-C}_4$ alkyl and R_9 represents a hydrogen or a polyalkylamine of the formula $-\text{[R}_8-\text{NR}_9\text{]}_n-$, wherein said R_9 or each alkylamine unit $-\text{R}_8\text{NR}_9$ may be the same or different in said polyalkylamine; and n and m represent, independently, an integer from 1 to 10; and

W represents a $-\text{CH}=\text{CH}-$, $-\text{CH}_2-\text{CH}(\text{OH})-$ or $-\text{CH}_2-\text{CH}_2-$ group.

137 (New). A vaccine comprising an amount of sphingoid-polyalkylamine conjugate and an amount of an immune response modulating biologically active molecule, the amount of said biologically active molecule being effective to modulate the immune response of a subject and the amount of said sphingoid polyalkylamine conjugate being effective to enhance the activity of said biologically active molecule on the immune response of the subject, wherein said sphingoid-polyalkylamine conjugate has the following formula (I):



wherein

R_1 represents a hydrogen, a branched or linear alkyl, aryl, alkylamine, or a group $-\text{C}(\text{O})\text{R}_5$;

R₂ and **R₅** represent, independently, a branched or linear C₁₀-C₂₄ alkyl, alkenyl or polyenyl group;

R₃ is hydrogen or a group -C(O)-NR₆R₇, in which **R₆** and **R₇**, being the same or different for R₃ and R₄, represent, independently, a hydrogen, or a saturated or unsaturated branched or linear polyalkylamine, wherein one or more amine units in said polyalkylamine may be a quaternary ammonium, and **R₄** is, independently, a group -C(O)-NR₆R₇, wherein at least one of **R₃** and /or **R₄** comprises said polyalkylamine; or **R₃** and **R₄** form, together with the oxygen atoms to which they are bound, a heterocyclic ring comprising -C(O)-NR₉-[R₈-NR₉]_m-C(O)-, in which **R₈** represents a saturated or unsaturated C₁-C₄ alkyl and **R₉** represents a hydrogen or a polyalkylamine of the formula -[R₈-NR₉]_n-, wherein said **R₉** or each alkylamine unit -R₈NR₉ may be the same or different in said polyalkylamine; and **n** and **m** represent, independently, an integer from 1 to 10; and

W represents a-CH=CH-, -CH₂-CH(OH)- or -CH₂-CH₂- group.

138 (New). The vaccine of Claim 137, wherein said biologically active molecule is an immune response stimulating or enhancing biologically active molecule and is present in an amount effective to stimulate or enhance the immune response of the subject.

139 (New). The vaccine of Claim 138, further comprising an immunostimulating agent.